



UNIVERSITI PUTRA MALAYSIA

**PRIMATE POPULATIONS IN LOGGED AND PRIMARY FORESTS OF
SUNGAI LALANG FOREST RESERVE, SELANGOR**

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FH 2001 7

**PRIMATE POPULATIONS IN LOGGED AND PRIMARY FORESTS OF
SUNGAI LALANG FOREST RESERVE, SELANGOR**

By

SUNDAI AK SILANG

**Thesis Submitted in Fulfillment of the Requirement for the
Degree of Master of Science in the Faculty of Forestry
Universiti Putra Malaysia**

July 2001



DEDICATION

Dituju ngagai....

Ms. Melinda (ya ti dikesayau),
aba, indai, bala menyadi, bala entua enggau
kaban belayan ka bukai. Aku besampi ngagai Petara awak ka
ia ngintu kitai belama serta ngajih ka bala kitai gerai
serta lantang lalu mujur belama dalam semua
pengawa.

Pesan ka kita semua:

“Maju meh kitai ngiga penemu di menoa urang.
Mansang ka mua meh kitai badu limbang nuju ka belakang.”

... oooha...

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in
fulfilment of the requirement of the degree of Master of Science

**PRIMATE POPULATIONS IN LOGGED AND PRIMARY FORESTS OF
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July 2001

Chairman: Mohamed Zakaria Hussin, Ph.D.

Faculty: Forestry

The primate study was conducted in Sungai Lalang Forest Reserve, Selangor. The objective of this study was to examine the characteristics of the primate populations in recently and old selectively logged forests, and to compare the populations with those in a primary forest. Three different areas were selected: Primary forest (VJR), Ten-year-old logged forest (Compartment 33 (C33)) and Five-year-old logged forest (Compartment 18 (C18)).

Distance Sampling using line transect method was used. Transect surveys were carried out for ten days in each area per month, from October 1998 - April 1999 for a total surveyed distance of 129.6 km. From the results, a total of 183 observations comprising five different species of primates were recorded. The *Presbytis melalophos* and *Presbytis obscura* were frequently found in the two logged forests. On the other hand, *Hylobates lar* was frequently observed in C33, while *Macaca nemestrina* was more abundant in C18. Meanwhile, the *Macaca fascicularis* was observed once and only in C18.

The density analysis (i.e., number of individuals per km²) shows that for Sungai Lalang Forest Reserve, the *P. obscura* and *P. melalophos* represented the highest densities of the five primate species with 55.1 and 52.4 ind./km² respectively while *Hylobates lar* was only 12.4 ind./km². The density of *P. obscura* was higher in C33 than in VJR and C18 with 76.5, 51.7 and 32.0 ind./km² respectively. The *P. melalophos* also recorded higher density in C33 than either C18 or VJR with 59.7, 57.6 and 44.8 ind./km² respectively. Logging seemed to have relatively little impacts on primate populations as demonstrated by *P. obscura* and *P. melalophos*. This was probably due to the fact that sources of food (e.g., non-dipterocarp trees) for the primates were not badly affected by logging activities. It was also found that there was no significant difference ($p > 0.05$) for primates' foraging height among the study sites although they seemed to be much lower in logged forests, especially in C18. Apart from that changes in microclimate conditions and canopy cover might not adversely affect the primate species.

This study found out that many primate species could survive in logged over forests especially in old logged forest. The ability of these primate species to sustain viable population densities in logged forests is probably dependent on intensity level of logging, age of the logged forest, proximity of other forests and the primates' adaptability in the logged areas.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

**POPULASI PRIMAT DI HUTAN LEPAS DIBALAK DAN HUTAN PRIMER
DI HUTAN SIMPAN SUNGAI LALANG, SELANGOR**

Oleh

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Kajian primat ini telah dijalankan di Hutan Simpan Sungai Lalang, Selangor. Objektif kajian ini adalah untuk melihat ciri-ciri populasi primat di hutan baru lepas dibalak dan hutan yang sudah lama dibalak secara sistem tebangan memilih dan membandingkannya dengan keadaan populasi di hutan dara. Tiga kawasan kajian telah dipilih: Hutan primer (VJR), Sepuluh tahun lepas dibalak (Kompartmen 33 (C33)) dan Lima tahun lepas dibalak (Kompartmen 18 (C18)).

Persampelan "Distance" menggunakan kaedah garis transek telah digunakan. Survei transek telah dilakukan selama sepuluh hari bagi setiap kawasan untuk setiap bulan iaitu daripada bulan Oktober 1998-April 1999 dengan keseluruhan survei berjumlah 129.6 km. Keputusan mendapati sebanyak 183 pemerhatian yang meliputi 5 spesis primat telah dibuat. *Presbytis melalophos* dan *Presbytis obscura* ditemui lebih kerap di kedua-dua kawasan lepas dibalak. Sebaliknya, *Hylobates lar* lebih kerap dijumpai di C33, manakala *Macaca nemestrina* lebih banyak dijumpai di C18. *Macaca fascicularis* telah dijumpai sekali dan hanya ditemui di C18.

Analisis kepadatan (contohnya, bilangan individu per km²) menunjukkan bagi Hutan Simpan Sungai Lalang, *P. obscura* dan *P. melalophos* mempunyai kepadatan paling tinggi berbanding primat lain dengan masing-masing 55.1 dan 52.4 ind./km²; *H. lar* hanya 12.4 ind./km². Kepadatan *P. obscura* lebih tinggi di C33 berbanding VJR dan C18, masing-masing 76.5, 51.7 dan 32.0 ind./km². *P. melalophos* juga merekodkan kepadatan yang tinggi di C33 berbanding di C18 dan VJR, masing-masing 59.7, 57.6 dan 44.8 ind./km². Pembalakan nampaknya kurang memberi kesan keatas populasi primat seperti ditunjukkan oleh *P. obscura* dan *P. melalophos*. Ini mungkin kerana sumber makanan (contohnya pokok bukan Dipterokarp) bagi primate, kurang diganggu semasa aktiviti pembalakan. Didapati juga tidak wujud perbezaan beerti ($p > 0.05$) untuk ketinggian mencari makanan bagi setiap spesies diantara kawasan kajian, walaupun ianya adalah lebih rendah di hutan lepas dibalak terutama di C18. Selain daripada itu, perubahan iklim mikro dan litupan kanopi mungkin juga kurang memberi kesan kepada spesis primat.

Kajian ini menunjukkan bahawa terdapat spesis primat yang boleh hidup di hutan lepas dibalak terutama yang sudah lama dibalak. Kemampuan mengekalkan kepadatan populasi yang kukuh bagi sesuatu spesies primat di hutan lepas dibalak mungkin bergantung kepada intensiti pembalakan, usia hutan yang telah dibalak, jarak dengan hutan yang lain dan keupayaan species primat menyesuaikan diri di kawasan yang telah dibalak.

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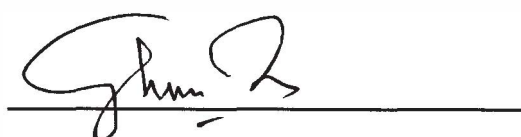
I certify that an Examination Committee met on 14th July 2001 to conduct the final examination of Sundai Ak Silang on his Master Degree thesis entitled "Primate Populations in Logged and Primary Forests of Sungai Lalang Forest Reserve, Selangor" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1080 and Universiti Pertanian Malaysia (Higher Degree) Regulations. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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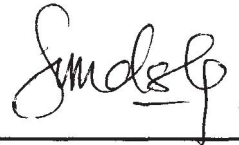


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DECLARATION FORM

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declared that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



SUNDAI AK SILANG

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LIST OF ABBREVIATIONS

Bt.	-	Bukit
dbh	-	Diameter at Breast Height
C18	-	Compartment 18
C33	-	Compartment 33
FAO	-	Food and Agriculture Organization
F.R.	-	Forest Reserve
ha	-	Hectare
LTS	-	Line Transect Sampling
MUS	-	Malayan Uniform System
Sg.	-	Sungai
SMS	-	Selective Management System
VJR	-	Virgin Jungle Reserve

CHAPTER I

INTRODUCTION

There have been numerous studies examining the effects of selective logging on wildlife. Most of the studies on primates were mainly looking at the effect of habitat disturbance and also their behaviour (e.g., Johns 1981, 1983, 1985, 1986, 1992; Wilson and Wilson 1975; Wilson and Johns 1982). Most of the studies revealed that many primate species could still survive and the population has increased in some logged forest, especially in old logged area. Plumptre and Reynolds (1994) also found that the population density of some primate species in a moist semi-deciduous tropical forest of Budungo Forest Reserve, Uganda, was significantly higher in logged area. A similar pattern was also observed in Gabon (White 1992) and in Ituri, Zaire (Thomas 1991), where most primate species occurred at higher density in secondary forest. In Tiwai Island, Oates *et al.* (1990) had recorded the highest primate biomass in disturbed forest.

The tropical rain forest for example is an extremely valuable economic resource for timber production. However, in Southeast Asia for example, the increasing rate of forest exploitation had caused much of the extent tropical forests to become a secondary forest. Rapid loss of habitat due to human pressure on the environment was among the major problem faced by wildlife conservationists in global today. The critical wildlife habitat such as the

lowland forest in the tropic is rapidly diminishing especially in the developing country. Therefore, detailed studies on the impacts of loss of the forest towards animals are urgently needed to get a better understanding of their population pattern in disturbed areas.

In Malaysia, many studies have examined the effects of logging (selective logging) on wild animals, especially on birds and other mammals e.g. primates (Chivers 1974; Dahaban 1996; Johns 1983; Zakaria 1994). However, only few studies had been done as far as the population pattern of wild animals in logged forest is concerned. For example, studies on primates were mainly looking at the effect of habitat disturbance and their behaviour (Johns 1981, 1983, 1985, 1986, 1992; Wilson and Wilson 1975; Wilson and Johns 1982). Therefore a detailed study, are urgently needed to get a better understanding of their population pattern in a disturbed area.

Problem Statement

The increasing rate of forest disturbance has increased the awareness on the importance of a sustainable use of tropical forest. Some areas have been set aside to form a protected area for wild animals. Apart from that the sustainable forest management has also been introduced to ensure that the forest and the wildlife habitats are protected. Nevertheless, rapid loss of habitat due to human pressure on the environment was among the major problem faced by wildlife conservationists in global today.

The tropical hardwood forest for example is an extremely valuable economic resource for timber production. However, the increasing rate of forest exploitation had caused much of the extent tropical forests to become a secondary forest. Studies on the impact of commercial logging on wildlife in the tropic have been conducted at several sites in Latin America and Asia. Most of the studies involved the comparison between logged and primary forest where mature trees of commercial timber species which have been cut and hauled out by heavy machinery (Anderson and Katz 1993; Johns 1985, 1987, 1992, 1995; William and Petrides 1980). Detailed studies that examine the population pattern of animal species in disturbed area especially, by logging activities have gained less attention particularly in the tropical forest. However, in general, logging is believed to have significant effect on certain species of animals. Therefore this study is an attempt to find out whether primate species are also affected by logging activities. Result from other studies recorded that, some primate populations were not affected by forest disturbance (e.g. Johns 1983; Plumptre and Reynolds 1994; Thomas 1991; White 1992; Wilson and Wilson 1975, 1982). Infact, certain primate species had increased in terms of population density in logged areas. Therefore, such knowledge is needed to refine the accuracy of predictions concerning their survival, persistence and resilience in disturbed habitat such as logged over forest.

Justification

Majority of the forest areas in Peninsular Malaysia, especially the lowland forest had been logged and become degraded or formed into secondary forest. Over the years the logging operation began to encroach upon the hill forested area. After which, this area will eventually be subjected to disturbance by logging in the future. Thus, there is an urgent need to determine the extent of impacts of this disturbance toward primate populations of the area. It is important that the information gained will become a guideline in formulating an effective management plan on forest utilization and forest operation to ensure the survival of the animal species in the future.

Objectives

The general objective of the study is to examine the primate populations in recent and old selectively logged forest and compare with those in primary forest. The specific objectives of this study are:

1. to determine the primate species composition in both logged and primary forests.
2. to determine the population density of primate species between logged and primary forest.
3. to examine the impact of selective logging on primate species in logged forest.

CHAPTER II

LITERATURE REVIEW

Arboreal Primates in Peninsular Malaysia

Malaysia is thought to harbour some 185,000 species of fauna and about 12,500 species of flowering plants. In the vertebrates for example, there are about 300 species of wild animals, 700-750 species of birds, 300 species of amphibians and more than 300 species of freshwater fish (Ministry of Science, Technology and Environment 1998). Out of the 300 species of wild animals that were probably found in this country, 16 species belong to the primates, which comprised three different families. These primate species can be divided into two main groups: the nocturnal species and the diurnal species. The diurnal group is the largest group of primates that can be found in Malaysia, with a total of 15 species. These primates include one species of the great ape, four lesser apes, three cercopithecines and seven colobines (the biggest number of species within the group). The only nocturnal species that can be found in this country is the slow loris (*Nycticebus coucang*).

Table 2.1: Primate species in Peninsular Malaysia

Family	Scientific name	Vernacular names	
		Common name	Local names
Lorisidae	<i>Nycticebus coucang</i>	slow loris	Kongkang
Cercopithecidae (Subfamily Colobinae)	<i>Presbytis melalophos</i>	banded leaf monkey; banded langur	Ceneka; lotong hitam; kekah;
	<i>Presbytis obscura</i>	dusky leaf monkey; dusky langur	Cengkong; lotong berchelak Lotong mata putih
	<i>Presbytis cristata</i>	silvered leaf monkey; silvered langur	Lotong kelabu; lutong (lotong)
(Subfamily Cercopithecinae)	<i>Macaca fascicularis</i>	long-tailed macaque	Kera
	<i>Macaca nemestrina</i>	pig-tailed macaque	Beruk (berok)
	<i>Macaca arctoides</i>	stump-tailed macaque	Berok kentoi
Hylobatidae	<i>Hylobates lar</i>	white-handed gibbon; lar gibbon	Ungka tangan putih; wa-wa; wak-wak; mawa
	<i>Hylobates agilis</i>	black-handed gibbon; agile gibbon	Ungka tangan hitam; ungka; wa-wa
	<i>Hylobates syndactylus</i>	Siamang	Siamang; ungka

Source: Chivers (1980); Marsh and Wilson (1981)

Out of the 16 species of primates that were found in Malaysia, ten species occurred in the peninsular. These include three lesser apes, three macaques, three langurs and one prosimian (Table 2.1). However, due to very limited information on certain species e.g. stump-tailed macaque, slow loris and agile gibbon, this study focused only on the other species, such as the following.

Dusky Leaf Monkey

The dusky leaf monkey or spectacled leaf monkey (*Presbytis obscura* Reid) is a uniformly grey in colour (Figure 4.1). In Peninsular Malaysia it is called “chengkong”. It has long tail, dark hands and feet, and a dark grey face. This species can be easily identified in the forest by a white ring that is present around the eyes (very distinctive) and also a white patch on the mouth. The infants of this species are bright orange at birth and all the time attached to her mother. According to Curtin (1980), there is no sexual dichromatism. Adults of this species weight about 7 kg, where male is more heavy than the female (Curtin 1980; Roonwal and Mohnot 1977).

According to Marsh and Wilson (1981) and Medway (1969, 1970), the dusky leaf monkey or *P. obscura* is widely distributed throughout the Peninsular Malaysia, including the island of Penang, Langkawi and Perhentian. In Peninsular Malaysia this species is restricted to the lowland area, and does not extend above 900 m (e.g. on G. Benom) (Caldecott 1980) and they are abundant in area below 600 m altitudes (McClure 1964).). The *P. obscura*

occurs in all types of forest except in mangrove and freshwater swamp forests. It also occurs in some peat swamps but only in areas where peat is relatively shallow (Marsh and Wilson 1981).

The mean group density of *P. obscura* as estimated at eight undisturbed lowland forests is 3.8 groups/ km² (Table 2.2). The densities of *P. obscura* depend on food resources available in the forest (Waterman *et al.* 1988). Together with *P. melalophos*, it is the commonest at all non-swamp forest areas (Marsh & Wilson 1981).

Banded Leaf Monkey

The banded leaf monkey, *Presbytis melalophos* Raffles, is similar in size to dusky leaf monkey. The male and the female are almost similar in size (male 6.3 kg, female 6.4 kg; Napier and Napier 1967). There are no distinguishing external characters to identify this species. The banded leaf monkeys have dark grey or brown back with light grey to white underparts and a dark grey face framed by white cheek ruffs (Curtin 1980; Roonwal and Mohnot 1977). They also have long tail like dusky leaf monkey. In the field, they can be easily recognised from the dusky leaf monkey by the absence of white ring on the eyes and also the newborn are mainly pale grey, compared with the infant of dusky leaf monkey being bright orange.

The banded leaf monkey or *Presbytis melalophos* is widely distributed throughout the Peninsular Malaysia's non-swampy areas except in Penang,

Langkawi and parts of Kedah and Perlis (Marsh & Wilson 1981). It can be found in almost all elevations (and can extend up the hills) than any other leaf monkeys. According to Caldecott (1980) this species can be found up to 1600m at Gunung Benom. However, it is abundant in area below 600 m altitude (McClure 1964). In Peninsular Malaysia the species is common in all types of forest and woodland and often invades rubber and other plantations (Medway 1969). Although this species is arboreal but they also come to the ground and often occurs in the same area as *P. obscura* (Medway 1969).

According to Marsh and Wilson (1981), the numbers of *P. melalophos* tend to be slightly higher in the south than the north of Peninsular Malaysia. The mean group density estimated from eight undisturbed lowland sites (Table 2.2), is 6.0 groups/ km² (Bennett 1991). The *P. melalophos*, together with *P. obscura* are the commonest primate in all non-swamp forest area (Marsh & Wilson 1981). The *P. melalophos* occurs in all types of lowland forest and hill forest except in mangrove and some freshwater swamps, although it is common in peat swamp forests both east and west coasts (Marsh and Wilson 1981). The density of this species is correlated with the ratio of protein to fibre in forest leaves because this determines the food availability when other sources are scarce (Waterman *et al.* 1988).